



Conference

June 8th 2011 Natural History Museum London

Summary of Presentations

Stuart Hine Natural History Museum.

The Angela Marmont Centre for UK Biodiversity

This national Centre for the study and understanding of UK biodiversity was opened at the Natural History Museum on 18th May 2010. It was created with a large donation by Tony Marmont in memory of his wife Angela Marmont, who was a teacher and a keen naturalist. It should be of great value to gardeners interested in the species in their plots.

The Centre is a resource to support UK naturalists in the broadest sense, covering zoology, botany, entomology, geology and palaeontology. It is a cornerstone of the Natural History Museum's contribution to understanding the UK's biodiversity, providing a hub for amateur and professional naturalists and UK natural history societies, which are encouraged to access the centre's resources and explore the potential for future partnerships within the museum. Our Mission and Vision are:

To nurture, inspire and develop existing and future naturalists.
and

To become a leading national centre for the collaborative study of UK natural history – a resource for everyone with an initial, developing or established interest - providing advice, support, information and engagement.

Our objectives are to:

- Make our British Isles collections and resources more accessible
- Extend our reach through targeted work with partners and groups
- Inspire and nurture the **next generation** of naturalists and taxonomists
- Increase the profile of UK work and citizen science

The Centre offers a range of facilities to support naturalists, including:

- Access to collections
- Library and virtual information resources
- Free work space for society members and private individuals
- Workshop and meeting room facilities
- An identification and advisory service

Collections include:

- British Herbarium of flowering plants (complete)

- Reference collections Zoological specimens (in part)
- “ “ UK fossils (under development)
- “ “ UK minerals (under development)
- “ “ UK insects (70% complete)

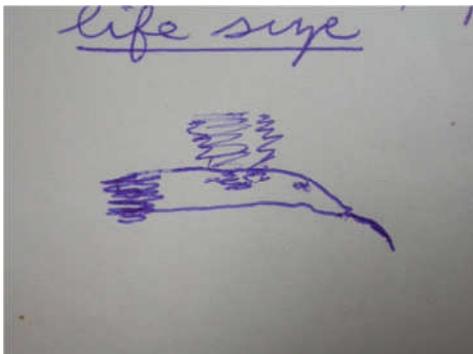
The centre includes the London Natural History Society library, microscopes, computers and imaging equipment, all available to visitors, together with help from the Centre staff and their combined knowledge. Its team of five dedicated IAS staff provides an Identification and Advisory Service for the UK public, by post, email, telephone and personal visit. The centre’s web forums tie in to an extensive network of experts and enthusiasts.

Since its launch just over a year ago, the Centre has averaged more than 300 visitors per quarter, and had innumerable enquiries by email, post and other means. Visitors leave with a positive feeling:

- *Knowledge - inspiration*
- *“I identified it myself, it’s not rocket science - more like ‘snap’ really”*
- *“There are more of these bugs in my garden – I think I will see if I can see the set”*
- *“Museum ‘ologists’ are pretty normal people – they even said I am welcome to come back”*

Typical queries include

- “What are these things eating my carpets/food/clothes?”
- “What is this strange creature, and will it harm my children or pets?”
- “What is this interesting creature I found in the garden?”



(some of the photos or sketches submitted leave a little taxonomic detail to be desired. This one is still recognisable as a hummingbird hawk-moth.

Commercial bodies have asked for information about inclusions in food products, agricultural pests and bio-control, and quarantine issues.



This is the “Identify your Bug” section which is building on the NHM website

www.nhm.ac.uk/nature-online/life/insects-spiders/bug-forum/?q=gallery

To book a visit to the Centre email at amc-booking@nhm.ac.uk or telephone 0207 942 5045 You can contact the Identification & Advisory Service at 0207 942 5045 or by email at ias1@nhm.ac.uk (commercial) and ias2@nhm.ac.uk (public & non commercial). Our website is <http://www.nhm.ac.uk/natureplus> If you want to visit with fossils and “things in jam jars” ask for the Angela Marmont Centre Monday-Friday & the first weekend of each month (March – October)

Ambra Burls UK UNESCO Man and Biosphere (MAB) Urban Forum

Education (as new innovative curricula for practitioners) and public engagement.

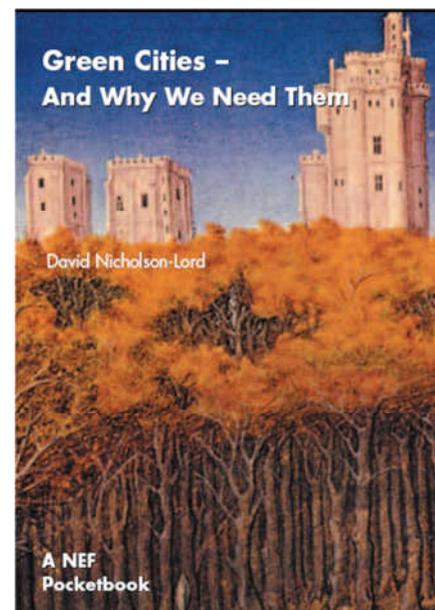
Homo sapiens officially became a predominately urban species in 2008¹. There are more than 50% of us worldwide living in towns and cities, and if present trends continue, by 2030 roughly 70% of humanity will live in urban areas. There is a risk that these areas will become less and less green, with fewer street trees, gardens, parks and green views, and consequently less wildlife.

We must promote the greening-up of our cities. The New Economics Foundation envisages cities of the 22nd century that are healthier, better for wildlife, more efficient on climate change and more socially inclusive².

Research suggests that ‘a significant experience of nature’ has positive outcomes for the general public in terms of health and social inclusion.

A recent report by Frances Kuo³ has recommended that nature should be brought to people where they live, integrating it in people’s routines and daily life and encouraging local stewardship of green assets. This encourages people to nurture themselves and their communities alongside the environment.

These processes were confirmed by my own research, and the London wildlife garden (one of my case studies) does just that: it has been bringing nature to people for almost two decades.



¹ United Nations Population Fund - State of World Population 2007 Unleashing the Potential of Urban Growth

² David Nicholson-Lord 2003. Green Cities and why we need them. New Economics Foundation. See www.urbanwildlife.org.uk/assets/userfiles/000074.pdf

³ Frances E. (Ming) Kuo 2010. Parks and Other Green Environments: Essential Components of a Healthy Human Habitat. National Recreation and Park Association. See: [www.nrpa.org/uploadedFiles/Explore_Parks_and_Recreation/Research/Ming \(Kuo\) Reserach Paper-Final-150dpi.pdf](http://www.nrpa.org/uploadedFiles/Explore_Parks_and_Recreation/Research/Ming_(Kuo)_Reserach_Paper-Final-150dpi.pdf)



This is the MIND Meanwhile Wildlife Garden which is part of the Meanwhile Gardens in Kensington and Chelsea.

Starting in 1976, the Gardens were created from a canal-side waste land or brown field site. Initially it was only a temporary facility (hence the name “Meanwhile”). The MIND wildlife project was initiated in 1993 and it has developed into a wildlife haven through the efforts of volunteers. It is managed on a daily

basis by green space ‘stewards’, working for wildlife. The environmental aim of the project is to provide a range of habitats for urban wildlife, but it is a multifunctional wildlife garden open to the public at all times. The participants are people who live in the borough, have been unable to access mainstream employment or education, and have health issues. They become trainees and are here for therapeutic support and skills development. Within this MIND project they obtain mainstream land-care related qualifications and work as members of a social enterprise.

The people who work here do more than gain therapeutic support. They are working with planners, developers, the community, schools, the NHS and social services, and their work directly contributes to local green infrastructure plans. Through this work they also develop hope; self-esteem; social integration; a sense of place and enhanced social dexterity. People talk of ‘having come off benefits’ and having ‘a face to society’ as gardeners who are now employed.

Defying their ‘disadvantaged’ label goes even further when these “socially silent” people become spontaneously committed to influence others (the process of embracement)⁴. As they develop skills and knowledge with which they engage with the public, their stories become much more convincing and engaging than messages from academics, scientists, health professionals or environmentalists. The public develop interest in what they do and a wish to be involved in safeguarding this green space as a local asset.

Information provision at the Meanwhile Wildlife Garden doesn’t rely on traditional static interpretation boards, because ‘Interpretation people’ have become the source of knowledge and help to educate the general public about the benefits of nature and the health of the environment.

These therapeutic wildlife and biodiversity conservation activities are embedded in ecotherapy and ecohealth. This trans-disciplinary approach aims to drive social change in the way we interact with our ecosystem and to take account of all types of knowledge about the interface between ecological and human health and well-being. Ecohealth is about equitable participation of laypeople, scientists, practitioners, organisations and businesses.

⁴ Burls and Caan (2004) *Journal of Primary Health Care Research and Development* 5, 191-192

Disciplines such as ecology, biology, epidemiology, veterinary and human medicine take on a wider remit of public health which purposely includes the health of the ecosystem. My research was primarily aimed at defining the practice of ecotherapy and developing Higher Education curricula in ecotherapy, and that I have done and delivered for the first time in the UK last year.

For me the greatest value of training practitioners in the fact that apart from the therapeutic benefits, they will be recognised for all their other skills, which meet many of the policy objectives of many organisations. Their actions are reflected in the mission of, for example, NHS forests⁵, the Office of the Deputy Prime Minister's Sustainable Action Plan and Green Wise.

In introducing the UK National Ecosystem Assessment, the Secretary of State for the Environment talks of people's need to "understand the true value of nature and how to sustain the benefits it gives us"⁶.

The Centre for Sustainable Health Care⁷ wants to '*inspire, empower and transform*', and the Meanwhile Wildlife Garden practitioners do indeed inspire the public, empower individuals and transform communities, leading the public to what I call Green Health Literacy. The consequence is a palpable and sustainable behaviour change. At Meanwhile crime has almost disappeared, vandalism is rare and only at the hands of non-locals. People will now stop and pick up other people's dogs' poo and any litter and protest at the bad-mannered behaviour of others, leaving a little notice (available from the Meanwhile office) in the place where they found the litter, politely asking the perpetrator not to do it again.

The local community now takes notice and individuals will pass by the office door or talk to the trainees saying: "[such and such] flower is out today", "the squirrel has just done [so and so]", "I've just seen the wren with 4 chicks" etc. In the past most of these people would have just strolled by without interest.

Other outcomes from these projects are that they can be the architects of the Mental Well-being Impact Assessment⁸, a "toolkit for well-being" cited to promote well-being addressing many factors at an individual and community level, such as control, resilience, self-esteem, social networks and use of green spaces.

Based on the Foresight Project research⁹, the National Institute for Clinical Excellence defines mental wellbeing as a 'dynamic state in which the individual is able to develop their potential, work productively and creatively, build strong and positive relationships with others and contribute to their community. It is enhanced when an individual is able to fulfil their personal and social goals and achieve a sense of purpose in society'¹⁰.

⁵ <http://nhsforest.org/home>

⁶ Caroline Spelman, 2nd June 2011

⁷ <http://sustainablehealthcare.org.uk/>

⁸ National MWIA Collaborative (England) May 2011 see www.apho.org.uk/resource/view.aspx?RID=105908

⁹ 'Foresight Mental Capital and Wellbeing Project (2008) Final project report'. London: The Government Office for Science.

¹⁰ See for example www.nice.org.uk/nicemedia/live/12331/46014/46014.ppt

Participants at Meanwhile can contribute to the promotion of **mental capital**⁹. This encompasses:

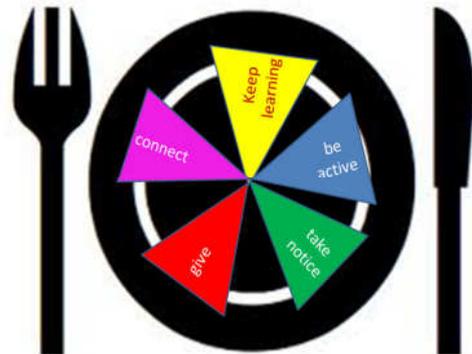
a person's cognitive and emotional resources, their cognitive ability, how flexible and efficient they are at learning, and their "emotional intelligence", such as their social skills and resilience in the face of stress.

Mental capital therefore is more than mental well-being because it:

conditions how well an individual is able to contribute effectively to society, and also to experience a high personal quality of life. The idea of "capital" naturally sparks association with ideas of financial capital and it is both challenging and natural to think of the mind in this way.

Ecotherapy, ecohealth and the corresponding behaviour changes make it possible for the five activities which lead to mental capital to be present in everyday life. Here is my "five a day approach" to mental capital and wellbeing from the Meanwhile wildlife gardening experience:

- connect with others (ecotherapy and green spaces facilitate social networks),
- be physically active (looking after the environment requires physical input)
- take notice of wildlife and nature (it is well known that nature facilitates this form of mindfulness)
- keep learning (ecohealth activities lead to new skills and knowledge)
- give (for all those who are involved, including the local community, giving their time to the Meanwhile Wildlife Garden is giving to a good cause).



Meanwhile Wildlife Garden is a model of multi-functional wildlife gardening which could be achieved by communities and projects in urban and rural areas. They would deliver the many agendas about happiness and well-being and urban green infrastructure. Practitioners like those at Meanwhile would be in a position to achieve these aims as well as promote public health and sustainable behaviour change.

Contact Ambra Burls at a.burls@btopenworld.com

Marc Carlton Private Gardener.

Closer to Nature: How we can use garden flowers to attract and support pollinating insects.

I have been a gardener since the age of 6, and my experience of wildlife gardening has grown from managing an allotment and our Bromley garden in London, before moving in 2009 to Chepstow in Monmouthshire.

Flowers evolved with pollinators, not for people, so I approach garden planning from the pollinator's perspective. Insects feed on pollen, nectar or both, and it isn't just bees, but butterflies, moths, flies, wasps and hoverflies too. Currently, UK honey bees populations are low, and can only provide 34% of our pollination needs, down from 70% in 1984¹¹, meaning that the bulk of UK pollination is now effected by wild bee and hoverfly species.

I have found much useful advice and inspiration about planting for pollinators from the Xerces Society in the USA¹², and the German organisation Naturgarten eV¹³.



The photo shows part of my “Pollinator Border” in 2010, designed to be attractive to a range of wild bees and hoverflies. It is a planting style familiar to most gardeners, essentially a form of the classic “cottage garden” in the style of William Robinson, Gertrude Jekyll and Beth Chatto.

The relaxed planting is one matter; the choice of suitable plants is another. Should we plant anything that looks pretty (which is the basis on which garden centres operate)? Can we include “exotics” – plants from distant lands? Or should we use only UK native wild flowers?

The traditional summer display of hybridised bedding plants produces a “riot of colour”, but next to nothing for feeding insects. Most are double or otherwise highly bred flowers, selected for visual impact not environmental

qualities. Could we work to create a new paradigm for wildlife friendly bedding?

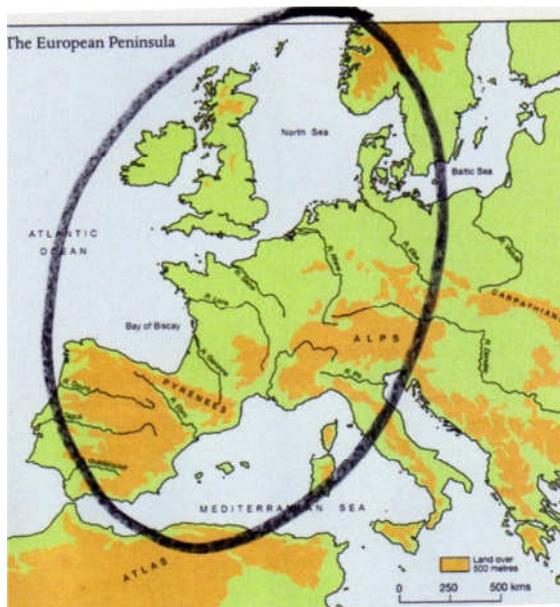
The majority of exotic plants in our gardens are likewise of limited value. Many are scarlet or orange, an indication that they evolved for bird pollination. Such plants include *Kniphophia*, *Fuchsia*, *Callistemon*, *Fritillaria imperialis*, and lantern-flower, *Crinodendron*. Some bumblebees will have a go at some of these, but on the whole they are not suited for the majority of British insects.

Should we confine ourselves therefore to “native” species ? Unfortunately, there is a rather limited choice, because the British flora is so depauperate. There is also a problem of the short flowering season of most natives, with very few late summer flowering species. But is the concept of “native to the UK” really valid or meaningful? Remember, we are talking about *gardens* not nature reserves.

¹¹ Breeze, T.D.; Bailey, T.D.; Balcombe, K.G; Potts, S.G. (2011) Pollination services in the UK; How important are honey bees? Agriculture, Ecosystems and the Environment (published online: 10.1016/j.agee.2011.03.020)

¹² <http://www.xerces.org>

¹³ <http://www.naturgarten.org>



The UK is nothing more than a peninsula of Europe, and has only been separated for some 8,000 years, after a brief post-glacial period of recolonisation across the north sea land bridge. Our flora is a shared subset of that of western Europe, as is our insect fauna. American websites don't say "use plants native to your state or county", but "use plants of your region". Likewise in Germany, gardeners are advised to use plants from middle Europe. I choose Europe as the main region of origin of plants for my pollinator border. Some examples would be *Lamium orvala* from central Europe, *Anthemis tinctoria* from Europe and Asia, *Angelica archangelica* from southern Europe, and *Echium vulgare* from western Europe (including Britain). 70% of my garden plants are of European origin.

My second principle is to concentrate on flower forms which are close to nature, so no double flowers, complex hybrids or horticultural novelties. Plenty of garden cultivars do fall within my criteria, such as the single rose *Rosa* "Scharlachglut", *Salvia nemorosa* "Mainacht", and *Angelica sylvestris* "Vicars Mead".

I also include a wide variety of flower shapes and sizes, to help cater for the diversity of insect mouthparts and specialisations evolved to tackle different forms of flower. I then plant to ensure a succession of flowers from March to October, such as *Symphytum* "Hidcote Blue" for March to May, and *Aster novi-angliae* "Purple Cloud" from August to October.

I prefer to plant flowers in groups of "drifts" if space permits, as did Gertrude Jekyll. There is evidence that insects have to learn to notice/use each flower type, and that they prefer large stands of the same species. The honey bee "waggle dance" evolved to pass on information about large stands of suitable flowers.

I include some insect-friendly exotics. *Monarda fistulosa* from the USA is commonly known as Bee Balm or Bergamot. Anise Hyssop, *Agastache foeniculum* is another American flower, as are *Penstemon heterophyllus*, and *Aster noviangliae* "Purple Cloud", the New-England Michaelmas Daisy. You have to be careful with Michaelmas Daisies, many are very weedy or invasive, and wildlife gardening flower lists are often too vague. *A.noviangliae* is however "garden safe".

Many bee-friendly plants have blue or purple flowers. Bees can't see the red end of the spectrum, but their vision extends into the near ultra-violet, so they like blue and violet. Night feeding moths are often attracted to night scented and pale or white flowers.

My pollinator border is a "terrestrial coral reef", not only a mass of disparate shapes and colours, but alive with the movement of small creatures – but insects not fish.

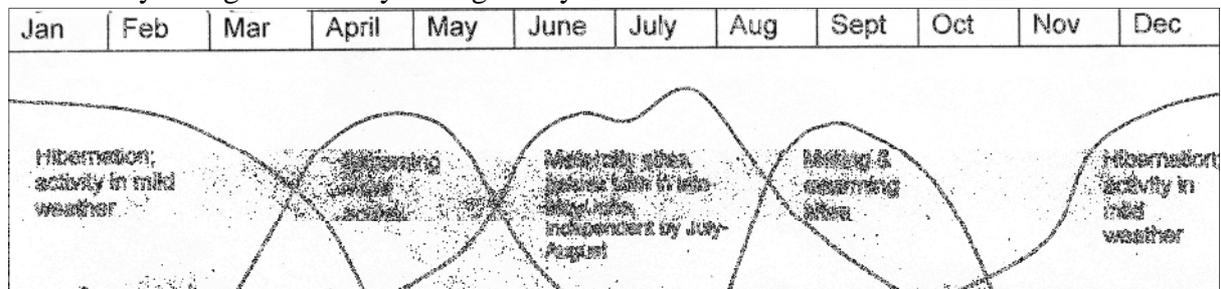
Contact Marc Carlton at fwg@phonecoop.coop. His highly recommended web site – which includes important fact sheets and species lists, is at www.foxleas.com.

Gardening for bats.

Bats are typical mammals, having furry bodies and giving birth to live young which are suckled on milk. However they are unique amongst mammals in having the power of flight. All UK bats eat insects, and since flight is metabolically expensive, they need to eat very large numbers. As nocturnal animals, they rely on echolocation to both hunt and navigate. We use bat detectors to convert the frequency of their calls so we can eavesdrop on their activities.

There are seventeen resident species of bats in Britain; each has its own habitat and food preferences, and as they fly and echolocate they can even identify and select the chosen insects.

Bat activity changes markedly through the year:



They are most active in the summer, when they give birth and feed their young in maternity roosts, coinciding with the maximum insect abundance. In this they are less efficient than birds, which feed insects directly to their nestlings. Bats have first to process insects into milk before feeding their young, involving energy losses in the transfer, so pregnancy and lactation are especially critical times when an abundance of insects is essential to survival.

How can we make our gardens more useful for bats? You often read that you should plant lots of night-scented flowers to attract moths. The colour and perfume of flowers serve no intrinsic role in the plant, but have evolved as bait to attract pollinating insects. Only bees and some larger Lepidoptera can feed from plants with long tubular petals, and these larger insects are suitable prey for larger bat species, like the long-eared bat, which harvest the insects attracted to honeysuckle for example.

Small bats like the common and soprano pipistrelles, are tiny enough to fit in a matchbox. They may eat as many as 3,000 small insects in a night, but are unable to eat large ones. Open flowers with a mass of short tubular florets will attract tiny insects like the smaller flies they need. Flowers suitable for short-tongued insects include

- All daisy and daisy-like flowers
- Flowers white or pale in colour to show up at dusk.
- Single flowers are better than doubles
- Umbellifers, with tall flat heads, are particularly good.

Garden plants that are suitable for smaller insects include:

- Marigolds
- Buttercups
- Many crane's bills
- Single asters
- Black-eyed Susan
- Poppies
- Poached egg plant *Limnanthes douglasii*

Bat species	Preferred food
Pipistrelle species	Midges, caddisflies, mayflies, small moths, mosquitoes
Brown long-eared	Moths, flies, beetles, earwigs, spiders
Serotine	Large beetles, flies, moths
Daubenton's	Small flies (esp. chironomid midges), caddis flies mayflies
Natterer's	Flies, moths, spiders, small insects
Whiskered and Brandt's	Moths, small insects, spiders
Greater horseshoe	Chafers and dung beetles, craneflies, moths
Lesser horseshoe	Flies (mainly midges), moths, lacewings, caddis flies, spiders

Summary of food preferences for some common bat species

As when providing for bees and other pollinators, the overall message is grow a wide range of flowers in succession through the year to give a continuity of insect supply:

March	aubretia, forget-me-not, honesty marigolds
April	bergenia, periwinkle, rosemary, wallflowers
May	crane's bill, rowan, hawthorn
June	hollyhocks, poppies
July	poached egg plant, evening primrose, lavender
August	sweet williams, rudbeckia, buddleia
September	Michaelmas daisies, ice plants

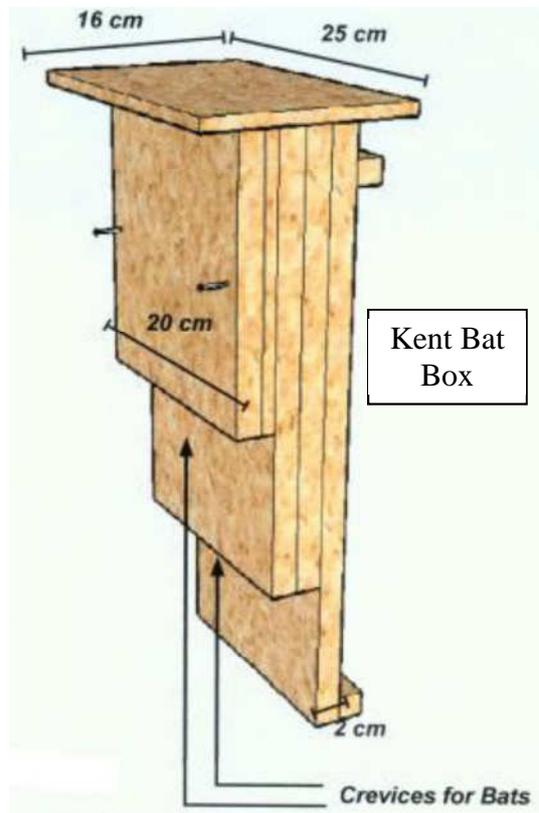


Bats can be helped by providing shelter belts in the garden, which encourage concentrations of insects. Provide support for fragrant climbers, and consider a structure (*like the one to the left*) where climbers create roosting space for bats and insects.

Although flowers attract flying insects to be eaten by bats, other plants are needed to provide food for insect larvae. Trees are a valuable source of larval food, and provide food and shelter for adult insects, and act as a focus of insect activity, helping bats to feed. Trees also allow roosting opportunities for bats.

Ponds are particularly valuable for pipistrelles, because many of their favoured prey like midges and mosquitoes have aquatic larvae. Large ponds are often one of the best places to observe bats in the early evening as they hunt over the water surface.

Gardeners should avoid use of insecticides, which reduce insect prey levels, and can be accumulated in fatty tissue, which can cause poisoning during hibernation when fat is broken down and the chemicals released. Alternative forms of pest control are available, including mixed planting with aromatic species, and creating suitable habitat for insect predators such as wasps, ichneumon flies, hoverflies, lacewings, ladybirds, ground beetles, centipedes, spiders and birds. Suitable structures include 'nest boxes' for bees, wasps, ladybirds, leaving hollow stemmed plants to overwinter, bundles of straws, holes drilled in wood blocks or bricks, log pile, compost heap and rockery.



If you do encourage bats into the garden, it makes sense to bring your cat in half an hour before sunset for at least an hour, especially from mid-June to the end of August.

Closed commercial bat boxes may be used by birds, and if used by bats should only be checked by a licensed person. So create roosting boards of rough surfaced planks held by battens about 25mm from the wall surface, or make a Kent bat box (design downloadable from the BCT website) which mimics the crevices favoured by pipistrelles, the species most likely to visit the garden, and which can be checked easily with a torch without touching it.

Shirley Thompson can be contacted at Shirley.t@noctule.info

You can download useful gardening information from the Bat Conservation website at www.bats.org.uk/pages/encouraging_bats.html

Chloë Smith Greenspace Information for Greater London / London Wildlife Trust

London: Garden City? Results of the London Garden Research Project

We developed this partnership project between London Wildlife Trust, the Greater London Authority and Greenspace Information for Greater London to find out more about what London's garden land is like and to address the paucity of knowledge relative to other greenspaces in the capital¹⁴.

A stratified sample of plots derived from Ordnance Survey data was used to examine gardens on aerial photographs from 2006-08. Estimates of different types of land cover were made and scaled up to get all-London figures. The same garden plots were also examined from

¹⁴ www.wildlondon.org.uk/LinkClick.aspx?fileticket=DFI0HHMtUfU%3D&tabid=101&mid=499&language=en-US

aerial photos taken at an earlier date (1998-99) to get empirical evidence to address concerns about land cover changes.

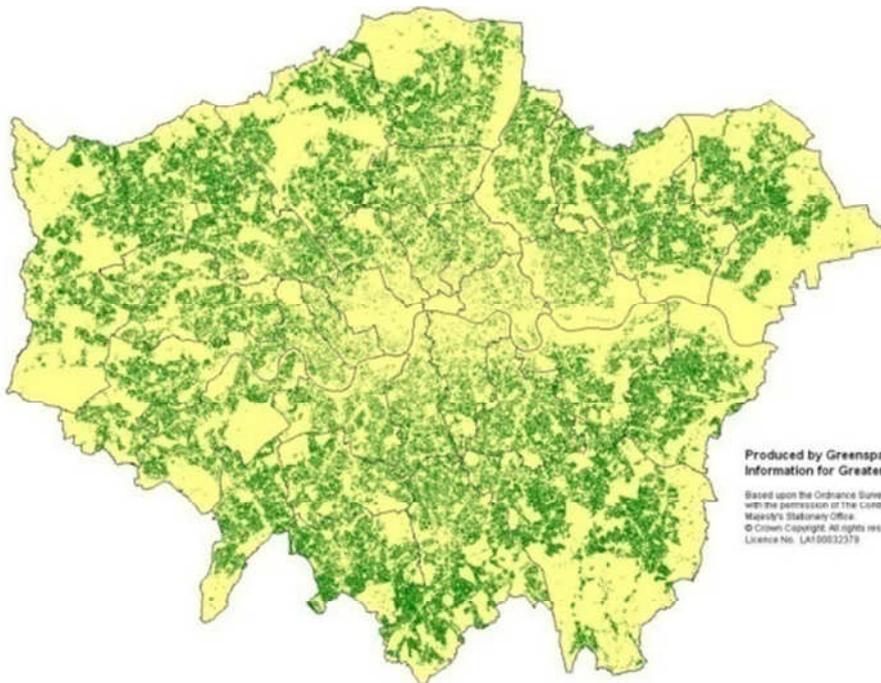
One of the outcomes was an update of earlier estimates of garden numbers. We can now estimate there are 3.8 million garden plots (including fronts, backs and miscellaneous type gardens) and together these cover some 37,900 ha of land. This is 24% of London – so gardens amount to a huge area of our capital.



Aerial image of some London gardens with varying degrees of hard surfacing/vegetation

There was a variety of size in London's gardens, but with smaller gardens predominating. Average garden sizes of 56m² (front), 150m² (back) and 170m² (miscellaneous type) were found.

Gardens were revealed to have changed over time. Vegetated land cover in gardens fell by 12% on 1998-99 figures by 2006-08, amounting to 3,000 ha less vegetation.



Map of London's gardens¹⁵

¹⁵ © Crown Copyright and database right 2011. Ordnance Survey 100032216. GLA

This change was equivalent to an area of 2.5 Hyde Parks per year less lawn, tree canopy and other planted cover. At the same time, hard surface increased by 26% and garden buildings by 56% (on 1998-99 figures by 2006-08). This amounted to 2,600 ha more hard surface and 1,000 ha more garden buildings (i.e. sheds, glasshouses) during the study period. These changes are driven by design choices within garden plots, as opposed to development on gardens.

Development on gardens was addressed by a sub-study. London Development Database data identified the footprints of completed housing developments on garden land. Aerial photographs were then examined for pre- and post-development land cover estimates to see what had changed.

Overall the average of 311 developments per year studied amounted to a relatively small loss of 6 ha of garden vegetation per year. Cumulative small changes in garden land cover choices (as described above) actually appear to have bigger London-wide effects. That being said, each development caused an average loss of 200m² of vegetated land – so this highlights it is sensible to assess the impact of housing development on garden land on the local level case-by-case.

The positive message that comes from the research is the amazing scale of the green resource that London's garden owners have in their hands. We estimate 57% of the capital's garden land is vegetated – that's a huge 22,000 ha of potential resource for wildlife habitat provision¹⁶, climate change adaptation and rain water absorption. This finding emphasises the valuable contribution of London's gardens to our green infrastructure and in providing people contact with greenspace and the outdoors.

Perhaps the challenge we have now as a gardening community is how to encourage garden design and management choices that best benefit wildlife and climate for the future, especially non-gardeners or those less interested in wildlife, in order to safeguard this valuable greenspace.

Contact Chloë at chloe.smith@gigl.org.uk

Zoë Randle Butterfly Conservation

The importance of gardens for Lepidoptera

Across Britain, 87% of homes have access to gardens, and the total garden area exceeds two million acres, about 3.3% of the UK. They contain almost 25% of all the trees occurring outside our woodlands. Gardens provide shelter, food plants and nectar, and are more diverse than the surrounding countryside.

In the last 50 years there has been a decline in urban greenspace, with tighter housing density, garden grabbing and loss of biologically diverse brownfield sites. There has been a trend for more concrete, decking and tarmac – and no insect wants this.



Gardens have a quite disproportionate role in raising environmental and conservation awareness, at schools, at home and in the community. Gardens are where most people have their first encounter of wildlife. As gardens are a major component of urban green space some remarkable insects can be encountered there, such as the Humming-bird Hawk-moth, the Elephant Hawk-moth together with its astonishing caterpillar, and butterflies like the brilliant yellow Brimstone which signifies the beginning of spring.

Butterfly Conservation runs the annual “big butterfly count”, in which participants record all species they can spot in one site, over a fifteen minute period¹⁷. The survey records 19 butterfly species and 2 day flying moths.

Specialists, like the Pearl-bordered fritillary, and the Large Blue, are NOT found in gardens, but in practice, we know rather little of the ecology of those species which are associated with gardens (possibly excepting the “cabbage whites”). The Biodiversity in Urban Gardens in Sheffield (BUGS) project team found only two Comma caterpillars on the nettle containers they set out in gardens, despite the fact that gardeners are urged by some books to tolerate nettles to encourage butterflies like the Small Tortoiseshell and Peacock. Two moth larvae were however found, the Burnished Brass and the Mother of Pearl¹⁸. It is possible that this disappointing result was because only *large* nettle patches are attractive to the target butterflies, which lay eggs in large numbers close together. Comma butterflies lay eggs singly, so may be more able to use small nettle patches in gardens.

There has been a long history – over 300 years, of recording moths in gardens. About 400 species could be encountered in an average urban garden. The highest number recorded so far is 1,223 species in a West Sussex garden¹⁹. Garden moths are a substantial part of garden biodiversity, and they are also an important part of the garden ecosystem, as herbivores and as prey to birds, bats, small mammals and other arthropods.

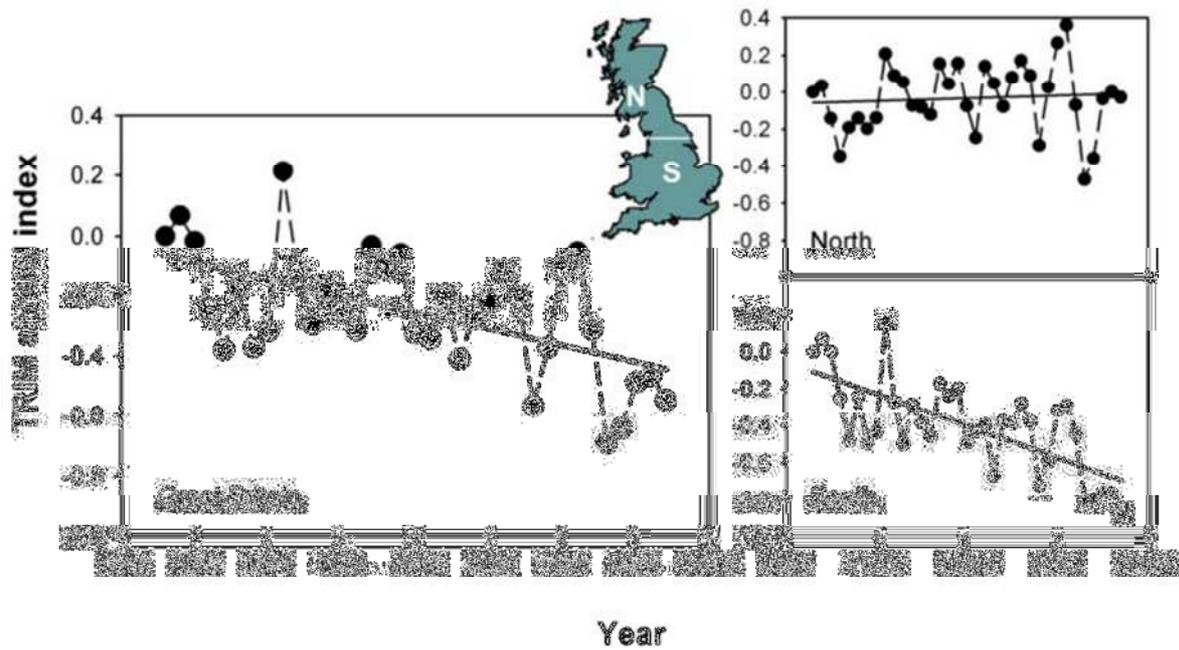
Unfortunately, moths are generally in decline, with over 60 species becoming extinct in Britain during the 20th century²⁰. Interestingly, it appears that the trend to decline is more severe in the southern half of Britain. This is presumably an indication of changing environmental conditions, which could include changing patterns of agriculture, habitat destruction, urbanisation, and possibly early signs of climate change.

¹⁷ www.bigbutterflycount.org/

¹⁸ Gaston, K.J., Smith, R.M., Thompson, K. & Warren, P.H. 2005. Urban domestic gardens (II): experimental tests of methods for increasing biodiversity. *Biodiversity and Conservation* 14, 395-413.

¹⁹ Grundy, D. 2009. Largest site and garden Lepidoptera lists in the British Isles. *Atropos* 36, 4-8.

²⁰ Fox, R., Conrad, K.F., Parsons, M.S, Warren, M.S. & Woiwod, I.P. 2006. *The state of Britain's larger moths*. Butterfly Conservation and Rothamsted Research, Wareham, Dorset.



Some examples of recorded declines in once common garden species include:

Garden Carpet	down by	69%
White Ermine		77%
Garden Tiger		89%
Spinach		95%

A few species are increasing, such as the recent colonist Blair's Shoulder-knot, a non-native cypress feeder. This moth has spread in the 20th century, increasing its population by 20,798%, and extending its range 365km north into Scotland and Northern Ireland. The Juniper Carpet is now doing very well on alien conifers and junipers planted in gardens, with a twelve-fold increase in numbers. The True Lover's Knot, a heathland species, is now thriving on heather cultivars in gardens.

In gardens, moths find breeding places, nectar sources, shelter and opportunity for colonisation. Better understanding of how moths use gardens, and how this pattern is changing, could help us give advice to make gardens even more valuable for more species.

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